



Micro2-Managed Microbial Communities: Next Generation Environmental Bio/Technologies

Smets, Barth F.; Mutlu, A. Gizem; Pellicer i Nàcher, Carles; Jensen, Marlene Mark; Vangsgaard, Anna Katrine; Sin, Gürkan; Gernaey, Krist; Vlaeminck, Siegfried

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Smets, B. F., Mutlu, A. G., Pellicer i Nàcher, C., Jensen, M. M., Vangsgaard, A. K., Sin, G., Gernaey, K., & Vlaeminck, S. (2011). *Micro2-Managed Microbial Communities: Next Generation Environmental Bio/Technologies*. Abstract from 1st International Symposium on Microbial resource management in biotechnology: Concepts and Applications, Ghent, Belgium.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Micro-2-Managed Microbial Communities: Next Generation Environmental Bio/Technologies

Barth F. Smets, A. Gizem Mutlu, Carles Pellicer i Nacher, Marlene M. Jensen, A. Katrine Vangsgaard, Gurkan Sin, Krist V. Gernaey, Siegfried Vlaeminck

Dept. of Environmental Engineering, Technical University of Denmark, DK

Dept. of Chemical & Biochemical Engineering, Technical University of Denmark, DK

Dept. of Bioscience Engineering, Ghent University, BE

Microbes are amazingly diverse in terms of the reactions that they catalyze. This diversity can be exploited to create competitive biotechnological solutions for many environmental challenges, where the right combination of existing microbial reactions can convert unwanted pollutants into a useful or harmless end-product. There are, however, significant scientific and technical challenges in order to combine potentially useful microbial reactions into a workable biotechnology, especially for processes that require the cooperation between microbial groups with very different properties and preferences. Simple empirical approaches often fail, and our intent is therefore to *rationally* manipulate the composition, that is, the microbial diversity of such systems, towards a target performance. Our hypothesis is that *controlled* biofilm or bioaggregate-based systems, wherein microbes grow in spatially structured assemblies, are suitable to harness these microbial potentials. We specifically aim to develop, implement and validate the feasibility of generic approaches for the rapid and efficient selection and management of the microbial composition *and* the micro-scale structure (micro²-management) of biofilms and bioaggregates for a target performance goal. These approaches are being implemented for the rapid start-up and high-rate operation of membrane-supported biofilm reactors and granular biomass reactors to attain a community consisting of aerobic and anaerobic ammonium oxidizing bacterial guilds (AeAOB and AnAOB) for autotrophic nitrogen (N) removal from wastewaters.

Submitted to First International Symposium on Microbial resource management in biotechnology: Concepts & Applications. June 30th–July 1st, 2011, 't Pand, Ghent, Belgium